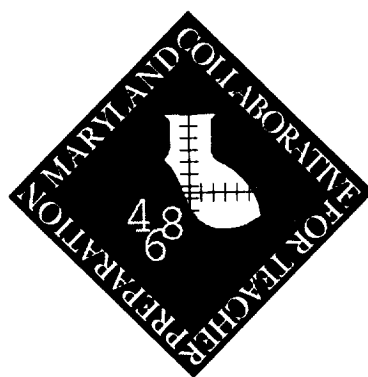


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**MCTP
SUMMER RESEARCH INTERNSHIP
PROGRAM**



RESEARCH PRESENTATION DAY

September 7, 1996

*MCTP is funded by a grant from the National Science Foundation, DUE # 9255745
The Summer Research Internship Program is funded by a grant from the
University of Maryland System*

"Experience Mathematics and Science in the Real World"

MATHEMATICAL CURRICULUM DEVELOPMENT FOR REAL WORLD PROBLEMS. Jennifer Sager and William Sacco, Ph.D. Tri-Analytics, Inc. and Think Smart, Inc., Bel Air, MD 21014.

Working for an applied mathematician at a consulting firm guided me to ask, "Which industries use mathematical methods?" and "Which methods do most consulting companies use to solve real world science and business problems?". Creating 26 lesson plans on various math methods using real life problems allowed me to gather data to answer the above questions. I created the lesson plans for 3 curriculum products. The first is a set of 3 lesson plans and a 30 minute presentation on ozone depletion for a group of teachers at the Governors Academy. My site mentor and I collaborated on the second product, a set of 8 lesson plans to accompany a monograph on glyphs. I am continuing to work on the third product, the Empower Math ⁷⁵⁻⁹⁰ PRIMER which will contain introductory lessons on the 75 math methods used in 90% of problems faced by business today. Examples of methods are: stem-leaf diagrams, box plots, glyphs, principle of optimality, branch and bound, quartiles, steepest descent. Four versions of the PRIMER will span grades 3 through 12. Two insights evolved from my summer experience. My formal mathematical training led me to expect that Calculus and Differential Equations would be used extensively in the curriculum products. However, all of the math methods I used were discrete math methods requiring only a knowledge of arithmetic. I had expected that the interaction between formal instruction and the workplace to be linear (one way). I found the interaction to be cyclic (circular): formal instruction is a prerequisite for employment in the work place, and the work place drives formal instruction.

RAIN EFFECTS ON AIR-WATER GAS EXCHANGE. Michelle Lee, Becky Wukitch, and Larry Bliven, Ph.D. National Aeronautics and Space Administration, Wallops Flight Facility, Wallops Island, VA 23337.

Working in the Rain-Sea Interaction Facility, a 50-foot high rain tower, we assisted our mentor in studying the effects of rainfall on air-water gas exchange. The purpose of this study was to provide a model which would be used in successive experiments in the Florida Everglades. The results of this study, in turn, would contribute to the data collected by NASA satellites which monitor the ocean's surface to help predict global climate. We participated in the air-water gas exchange study in two capacities: experimental preparation and experimental procedure. First, several weeks before the actual experiment, we set up the laboratory and acquired equipment for the experiment. This included calibrating instruments, fixing the rain simulator, and setting up computers for data collection. Secondly, we aided our mentor and two visiting scientists in the air-water gas exchange study by taking samples, recording data, and revising experimental procedure. Each experiment consisted of pumping water through a rain simulator hanging in the rain tower about 50 feet above a tub of water spiked with sulfur hexafluoride (SF₆). As rain fell into the tub, we would take samples of water from the tub to measure the amount of SF₆ still left in the water. Sampling would continue until traces of SF₆ were negligible. Computer-generated graphs of air-water SF₆ exchange summarized the conclusions of each experiment. In all, we conducted 23 experiments, each lasting about 3 hours, of varying rainfall flow rates and drop sizes. In addition, we ran control experiments (with no exposure to rainfall) throughout the study. As expected, the conclusions of the study indicated that rainfall causes air-water gas exchange, with heavier rainfall effecting faster exchange. Furthermore, the experimental design mimics nature since SF₆ is found naturally, and allows greater accuracy in applying data to *in situ* field experiments, such as the Everglades.

MULTI-RING IMPACT BASINS ON MARS. Jessica Thomas and Herbert Frey, Ph.D. NASA Goddard Space Flight Center, Geodynamics Branch Code 921, Greenbelt, MD 20770.

Multi-ring impact basins are formed when any large solid object, such as a large meteorite or a small asteroid, hits the surface of a planet. When the object hits, the intense heat and energy cause the planetary surface respond as water does when a pebble hits its surface and rings are formed. The planetary impact causes a round or oblong lowland area to form in its surface. The size of the object determines the force behind the impact and thus the effects of the impact on the surface, such as the size of the basin and number of rings. These structures had major influences on the geologic evolution of the surface of Mars, localizing volcanic activity, erosion and deposition. These structures may also be linked to the formation of the crustal dichotomy on Mars, and may provide a model for the early evolution of the earth's crust. The research focused on compiling evidence for multi-ring impact basins in the Daedalia region of Mars. By using controlled photomosaics from the Viking Orbiter to pick out concentric structures it was possible to map differences in terrain, such as partially covered craters, and high standing, high crater dense areas. Evidence was compiled for four basins. This information was used to locate a center and main ring for each basin on a digital image of that area. Outer rings were determined by features located concentric to the main ring at a common distance from the center. The table on the next page shows the latitude and longitude each basin's center point, the number of rings in each basin, and the diameter of each ring.

	Basin 1	Basin 2	Basin 3	Basin 4
Center Latitude	-36.9	-29	-27.7	-28
Center Longitude	113	119.5	131.8	148
Number of Rings	4	4	5	3
Ring Diameter	473km	408km	828km	434km
	579km	625km	1025km	578km
	722km	825km	1209km	717km
	828km	1041km	1403km	
			1579km	

The research provided significant evidence for four multi-ring impact basins in the Daedalia region of Mars. This study is a critical part in the ongoing process of the study of development of terrestrial planets.

DEVELOPING AN INTERACTIVE MULTIMEDIA EDUCATIONAL CD-ROM ON REMOTE SENSING.
Josephine To and Penny Masuoka. NASA Goddard Space Flight Center, Greenbelt, MD 20771.

The use of computers as educational tools is on the rise in today's world. It is possible to create interactive teaching programs by combining different forms of media. At Goddard, the Computing Systems Office actively uses computer technology in many projects, such as analyzing scientific data and conducting research on remote sensing. This summer the Computing Systems Office developed an educational interactive multimedia program on remote sensing. Remote sensing is the use of an instrument to gather and measure information about another place. Using Macromedia Director 3.0, the project staff combined images and text and organized the program into fourteen categories. Some categories included volcanoes, water, and deserts. My role in the project included enhancing images using Adobe Photoshop 3.0 and making the program features accessible to second graders. The latter role involved selecting information for inclusion on the CD and writing the text that would accompany the images. Following product testing, the CD-ROM should be distributed to schools for classroom use.

A PILOT OF AN ACTIVITY FOR FOR THE GLOBE PROGRAM. Stephanie Cheung and Elisa Levine, Ph.D.
 Biospherics Branch, NASA Goddard Space Flight Center, Greenbelt, MD 20771

The GLOBE Program was inspired by the vision of U.S. Vice-President, Al Gore. It consists of a network of students, teachers and scientists working together to learn more about the Planet Earth. This summer, my main responsibility was to assist in the development of soil activities to be included in the GLOBE Program Teacher's Guide. The focus of my research was to investigate the effectiveness of my soil erosion activity with respect to student understanding of the major concepts. To examine this, I tested the activity on six students ranging from kindergarten through the twelfth grade. My data collection plan included asking predetermined questions about soil erosion before and after the activity. Additionally, I took into account the comments and observations that the students made during the performance of the activity. The few problems that I encountered included the mechanics of the activity as well as age appropriateness. Although the activity was supposed to be geared towards all grade levels, it was obvious that the concepts were too difficult for younger elementary students to comprehend. Also, the length of the projected time to complete the activity was insufficient. The test results show that the instructions needed to be more clear and concise.

FOSSILS IN MARYLAND. Michelle Willemain and Carla Evans. Distributed Active Archive Center (DAAC), NASA/Goddard Space Flight Center, Greenbelt, MD 20771.

The goal of my internship was to create a fossil collecting guide for Maryland that is accessible on the World Wide Web. The guide's target population includes both people with and without a geological background. Ultimately I hope it will be useful in the classroom. Therefore my research also involved investigating teacher perceptions of this product as a potential classroom tool. To collect the data I browsed the web, visited various libraries, interviewed people, and visited the Maryland Geological Survey. To develop the web site I recruited the help of two local high school students who were interning with NASA. To assess the usefulness the website guide in the classroom I asked 3 teachers to view a demo version of the guide. Immediately after the viewing I posed the following questions to the teachers. Do you have access to a computer with internet connections? What is your general opinion of the website guide? Do you view the guide as being useful, both in the classroom and as a resource tool? Does the guide address any objectives of the Maryland State Performance Assessment Program. The teachers' general opinion of the website guide was enthusiastically positive, with one exception. They noted that some of the text was too complex for their students, who are at the third and fourth grade levels. Ongoing revisions to the website guide will address the teachers' concerns. The current version of the guide is under review for accuracy and it should be on the World Wide Web by October, 1996.

DEVELOPING CHILDREN'S PROGRAMMING FOR THE AMERICAN HORTICULTURAL SOCIETY AT RIVER FARM. Hazel Campos and Mark Miller. The American Horticultural Society at River Farm, Alexandria, VA 22308-1300.

The American Horticultural Society (AHS) was founded in 1922. AHS is an educational non profit organization that recognizes and promotes excellence in American horticulture through educational programs and the dissemination of horticultural information. Their mission is to educate our nation's gardeners to appreciate and understand the science, beauty, and environmental value of plants and gardens and to care for them in an environmentally sensitive manner. My task at AHS this summer was to transform an adult world into a child's world by developing children's programming for the American Horticultural Society. In order to develop educational products and activities, I researched past issues of magazines issued by AHS, accessed the internet, contacted several other organizations who have already developed children's programming, and searched through other software programs. During my internship at AHS, I was also given the responsibility of overseeing the children's programming for the field days held at River Farm: Discovery Day. Through the field days I was able to experiment with hands-on activities to see what children were interested in and what was the most practical. The biggest challenge I had during my internship was transforming adult concepts into concepts that children could understand. Despite the challenges I was able to produce a self-guided walking tour, several information pamphlets, activities on paper, as well hands-on activities.

CHILDREN'S LEARNING: EDUCATIONAL PROGRAMS OF THE NATIONAL PARK SERVICE. Christine A. Allen and Rachelle Daigneault. National Park Service, Assateague National Seashore, Berlin, MD 21811.

The objective of my research was to determine what and how children ages 9-13 learn while attending National Park Service interpretive/educational programs. I studied two programs. The "Bay Discovery" program stresses the importance of the salt marsh and takes a close look at some of the plants and animals that live in this environment. The naturalist led "Canoe Trip" program also stresses the importance of the salt marsh, and includes some of the natural and human history of the canoe trip area. Although many of the topics in the two programs overlap, their modes of presentation differ. I surveyed participants as they completed the programs. The arithmetic average of the Bay Discovery surveys (76.25%) was considerably higher than that of the Canoe Trip surveys (64.89%). I found the same trend when evaluating the frequency of correct answers within each question of these surveys. It appears that children learned more at the Bay Discovery program. However, many factors differentiate the two programs and may have influenced the outcomes I observed. For example, the Bay Discovery is a quick paced, hands-on program; the audience is in close proximity at all times. In contrast, the Canoe Trip spans two hours, involves very little touching of the natural elements that the guide points out during the trip, separates the participants into small groups (2-4 per canoe), and involves the additional distraction of the excitement of being in a canoe.

A STUDY OF CLIMATE AND STUDENT SATISFACTION IN TWO SUMMER PROGRAMS FOR DISADVANTAGED STUDENTS INTERESTED IN CAREERS IN MATHEMATICS AND SCIENCE. David Washington and Gilbert Austin, Ph.D. The Horizons Exploration Program, University of Maryland Baltimore County, Baltimore, MD 21250.

This summer I worked as a tutor counselor with the Horizons Exploration Program at UMBC. Throughout the program, I made observations on how two different groups of students felt about two different summer programs being run at UMBC. The Horizons Exploration Program consisted of 50 students entering the 9th grade from Baltimore City. The Upward Bound Math and Science program consisted of 50 high school students who came from 6 mid-Atlantic states -- Maryland, Delaware, Virginia, West Virginia, Pennsylvania, and Washington, DC. All of these students are interested in careers in math and science. I was interested in learning about their thoughts on the climate of the summer school and their level of satisfaction. I modified two questionnaires published by the National Association of Secondary School Principals and administered them to the 100 students. With my mentor, I conducted a series of statistical analyses on the data we collected with these 2 questionnaires. The analyses consisted of frequency distributions, means, and standard deviations. I also did independent t-tests and analysis of variance. I found a number of significant differences between the groups, based on age, gender, and race.

THE MARYLAND GOVERNOR'S ACADEMY: INTEGRATING TECHNOLOGY INTO THE CLASSROOM. Mary Hanna and June Danaher. Towson State University, Towson, MD 21204.

This summer at the Maryland Governor's Academy, I developed and answered two research questions: How does the Governor's Academy help teachers keep up with society's increasing technological advancements? How has the Governor's Academy changed to meet those needs? In order to answer these questions I researched the history of the Academy and I surveyed the teachers who participated in this summer's program. My historical research revealed a pattern of increasing attention to training teachers to make use of technological tools. The number of both training

sessions and technological tools that sessions addressed increased from the academy's first year (1989) to the present. For example, in 1989, the academy distributed calculators only to high school math teachers and offered no training sessions on their use. In contrast, 1996 the academy distributed calculators, CBL's and a variety of software, and provided at least two training sessions to teachers of all levels. My survey research revealed how the teachers felt about integrating technology into the classroom. The Academy helped them to feel more comfortable with the equipment and they were excited about using it in the fall. The teachers shared a variety of ideas on integrating technology into their classrooms, such as using it in labs, demonstrations, data analysis, and teaching fractions. I also learned that if the teachers had made a technology "wish list" prior to attending the academy, most of the items or training at the top of their lists indeed were made available to them at the academy. I concluded that the Governor's Academy is continually updating in order to best provide the teachers with practical knowledge they need to integrate technology into the classroom.

STREAM SAMPLING WITH THE MARYLAND BIOLOGICAL STREAM SURVEY (MBSS). William Carter and Scott Stranko. Maryland Department of Natural Resources, Monitoring and Non-tidal Assessment Division, Tawes State Office Building, B-2, Annapolis, MD 21401.

First implemented in 1993, the MBSS has several objectives regarding Maryland's streams and rivers: assess the current status of biological resources in non-tidal streams; establish a benchmark for long-term monitoring of trends; assess the impacts of acid deposition in Maryland streams; examine water quality, physical habitat, and land use factors that may explain the current status of biological resources in streams, and; focus habitat protection and restoration activities. To fulfill these objectives, teams of biologists and interns carry out stream sampling relative to the eighteen major drainage basins in the state. Stream sampling protocol yields data such as: water quality (temperature, dissolved oxygen, pH, and conductivity); habitat assessment, fish species richness and diversity (both game and non-game fish), weight, and anomalies; flow, and; herpetofauna (reptiles and amphibians), aquatic plants, and mussels observed. I worked with the team sampling the Patapsco River drainage basin and was an active participant in all sampling activities most notably, electrofishing. This technique sends an electric current through the water and stuns the fish making it possible to gather, weigh, identify, and examine them. Data collection and analysis are ongoing and results will be available through the Maryland Department of Natural Resources.

THE IMAGING SYSTEM INSPECTION SOFTWARE TECHNOLOGY: THE PREPARATION AND DETECTION OF NOMINAL AND FAULTED STEEL INGOTS. Fredda A. Smith and Mr. Frank B. Weiskopf. The Johns Hopkins University Applied Physics Laboratory, Laurel MD 20723-6099.

Carpenter Steel Mill approached the Johns Hopkins University Applied Physics Laboratory's Aeronautics Department regarding the use of their Imaging System Inspection Software (ISIS) technology. The objective was to develop an inspection system that would automatically recognize tears in the surfaces of steel ingots. Tears could be marked with paint so that only those portions of the ingot would be corrected. The mill provided a video tape of steel ingot images taken with an infrared camera during the rolling process. We extracted the steel ingot images from the video tape. We manipulated the images in many stages: color conversion, registration, rotation, resampling, and classification. We then classified each image as being either nominal or faulted and used it in either a training set or a test set in the ISIS application. The ISIS interactive program inspects images to detect and locate faulted items; input data were the objects to be inspected; output data were the inspection conclusions. We used the training sets to train the artificial neural network (ANN) to distinguish the two patterns. After several unsuccessful attempts to train the ANN, we reviewed the data and pulled some samples out of the training list because of their questionable image quality. The ANN trained successfully on the revised list. After the testing procedure we concluded that unsuccessful output inspection conclusions warranted major alterations. We chose to create hand drawn ingots of both nominal and faulted characteristics and use them in a training and test set. This was an attempt to enable the ANN to clearly distinguish between the two patterns. These hand drawn, or mock, ingots trained and tested successfully. We next included the mocks with the real ingots in training and test sets. These results were very encouraging. The conclusion of the study is that data samples of higher image quality result in highly accurate training and test results.

EVENT-BASED SCIENCE: THE DEVELOPMENT OF REAL-WORLD SCIENCE UNITS. Susan Buffington and Russell Wright, Ed.D. Event-Based Science, Montgomery County Public Schools, Rockville, MD 20850.

Event-Based Science (EBS) is a middle school curriculum development project that aims to increase student success in science. This project interests students in science by providing a "relevance," a "want-to-know," and a "need-to-know" by modelling the units after the real world and making them personal to middle school students. This summer EBS staff began the development of three new units. *Blight!*, a life science unit, uses the Irish Potato Famine of 1845 to interest students in learning about plants and plant diseases. *First Flight!* is a physics unit that uses coverage of first

attempts at flight as a motivator to interest students in discovering the principles of flight. *Fraud!* is a chemistry unit that allows students to test their classmates' art work to determine whether they are impostors. We tested draft versions of activities on middle school students to determine whether changes needed to be made. During the course of this preliminary field-testing, we surveyed the students to ascertain their feelings about the EBS units. The responses revealed that the students were initially frustrated by teachers' unwillingness to tell them the answers to their questions. However, they reported that they enjoyed the activities and they were successful in using them. As an intern I researched background information and lesson plans for the units, helped write and field test the activities, and assisted in the creation of the EBS home page. Event-Based Science is funded by a grant from the National Science Foundation.

CORRELATION BETWEEN ANXIETY AND PAST EXPERIENCES. Joanne DiPaula and Jodie Smolik. Discovery Creek Children's Museum of Washington, Washington, D.C. 20016.

The purpose of my study was to observe the relationship between children's past experiences with animals in natural habitats and the anxiety that children bring to these situations. All of the children in the study lived in the District of Columbia and were six years old. One group came from middle income families and were week-long (30 hours) campers at Discovery Creek. Another group came from a program for homeless children and spent 3 hours at Discovery Creek. I met and observed both groups of children. I first asked the children about previous experiences. Questions included: Have you ever been hiking? Have you ever owned a pet? Have you ever seen or touched [naming the animals that the children would be seeing during the hike]? Next I observed the children's reactions as we hiked through the woods and saw animals we had discussed before the hike. I noted each child's reaction when an animal was placed close to the child. Did the child scream or back away? If child petted the animal, was it only after encouragement or was it spontaneous? Within both groups I found both types of response to animals: anxiety and comfort. The homeless group exhibited a higher incidence of anxiety than the camper group. The homeless group also exhibited high levels of curiosity about the animals. The few campers who appeared to be anxious at the beginning of the week became comfortable with animals by the end of the week. My conclusions are preliminary because of the difference in observation time between groups of children (3 versus 30 hours). It appears that anxiety decreases when opportunities to see, touch, and hold animals in a natural environment increase.

ENVIRONMENTAL EDUCATION THROUGH SUMMER NATURE CAMP. Joni Jacobs and Jodie Smolik. Discovery Creek Children's Museum of Washington, Washington, DC 20007.

This summer I set out to discover how effective the use of outdoor activities were in environmental education. I also wanted to know how first hand nature experiences benefitted children's learning. Specifically, I was interested in knowing if the children's learning made enough of an impact so that they were able to remember the information and use it in a meaningful way in their own lives. To find the answers to my questions, I selected a sample of 5 children of various ages. I created a few questions about information that would be presented in an activity. Before the children started the activity I interviewed them and asked the questions I had created to see how much they already knew about the subject matter. During the activity I observed the children to learn how involved they were in their own learning. Immediately after the activity I posed the same questions to learn how much they had absorbed. I asked questions again two days after the activity to see how much information really stayed with them. I found that children were involved and able to have a first hand experience in outdoor activities. From the interviews, I found that the children learned and retained a lot of new information. By reviewing my results, I discovered that children can greatly benefit from activities that allow them to explore and investigate, which in turn helps them retain information and make meaningful connections in their everyday lives.

ENHANCING LEARNING OPPORTUNITIES AT THE SALISBURY ZOO. Heather McDonald, Rachel Tittermary, Jim Rapp, and Miriam Weinstock. Salisbury Zoological Park, P.O. Box 2979, Salisbury, MD 21802.

The Salisbury Zoo is a site for many field trips on Maryland's Eastern Shore. However, many of the teachers who bring their classes to the Salisbury Zoo do not fully take advantage of the instructional opportunities that are inherent in the zoo environment. We created a walking tour and accompanying activities for students that is intended to help teachers and students benefit from the zoo environment. We used an outdated tour guide, fact sheets, information provided by zoo keepers and our own background knowledge to design the tour and activities. Rachel Tittermary made adaptations to the tour guide to address the needs of elementary school students. This version of the guide consists of easy to use fact cards and a basket of interesting and useful fact cards. It also includes a set of activities for use before the class visits the zoo and another set for use following the visit. Heather McDonald made adaptations to the tour guide to address the needs of middle school students. This version consists of tour text and sets of pre-, during, and post-visit activities. Results as to the effectiveness of the tour and activities are not yet available; however, each teacher who uses

the tour and related activities will receive a questionnaire. Conclusions based on responses to the questionnaire will be available at the end of October 1996.

PLANT GROWTH EXPERIMENT: A MODULE FOR THE MIDDLE SCHOOL CLASSROOM. Stephanie Simmons and Laura Murray, Ph.D. Horn Point Environmental Laboratory, Cambridge, MD 21613.

I took part in an experiment designed to determine the effects of different nutrient loadings and trophic complexity on a submerged aquatic vegetation (SAV) community. The experimental design featured twelve tanks: 4 control, 4 with grazers to eat algae from the plants, and 4 with fish to eat the grazers. A measure of the response of the community to experimental treatment was plant growth. My job was to convert plant growth data, which we collected biweekly, to figures for growth per day per plant, per tank, and per treatment. From these figures, along with standard error, I created graphs to represent plant growth for each treatment. As the experiment progressed, I wondered how I could bring the skills I was using into the classroom. For this reason I designed a module of the experiment for use with middle school students. The activities allow students to integrate and apply their mathematics and science skills to growing and experimenting with SAV ecosystems. The topic's significance for students stems from the role and status of SAV. SAV provides homes to varied inhabitants of the Chesapeake Bay and is likewise an important food source for other organisms. Their population has declined along with the water quality of the Bay, which may pose a threat to other ecosystems. Thus students' involvement in the activities of the research community to search for conditions that support SAV communities is inherently worthwhile.

THE EFFECTS OF PROXISOME PROLIFERATORS IN JAPANESE MEDAKA EMBRYOS. Aisha Almond and Mary Haasch, Ph.d. CEES, Chesapeake Biological Laboratory, Solomons, MD 20688.

In this experiment I investigated the effects of dichloro-o-anisic acid, better known as the herbicide dicamba, on the larvae of Japanese medaka. This peroxisome proliferator was exposed to ten eggs in each of two different concentrations and a control, and in two different formats. The formats, static renewal and static non-renewal, involved different procedures for maintaining the chemical and rearing solution. The static renewal format involves daily extraction and renewal of the solution. The static non-renewal format involves maintaining the same solution for the duration of the experiment. I monitored the eggs over the normal incubation period of 11-14 days for stage delay, lesions, or death. If larvae hatched, I followed the fry for ten days post-hatch to observe the survival rate. Findings related to concentration and format are as follows. I had expected the highest concentration (10ppm) to have the highest death rate. I found that the controls had a higher number of lesions and deaths than either concentration. Format-related findings include a higher rate of lesion and stage delay for the static non-renewal format. The renewal format appeared to have an effect on urinary bladders and livers. I concluded that factors other than the experimental conditions may have affected the outcomes. For example, the high rate of post-hatch deaths may be linked to the infusoria I used to feed the fry. The infusoria may have contained a fungus.

DEVELOPMENT OF A CHAPTER ON BIRTH CONTROL AND CONTRACEPTIVE METHODOLOGIES AS PART OF AN INTERACTIVE COMPUTER-BASED EDUCATION MODULE ON HIV AND AIDS. Autumn Moore and Andrew Kane, Ph.D. Department of Pathology, University of Maryland School of Medicine, Baltimore, MD 21201

HIV infection is the leading cause of death among young males, ages 25-41, in the United States. Effective educational outreach targeted toward adolescents is the only intervention which can impact the spread of HIV and other sexually transmitted diseases. We are developing a dynamic, computer-based outreach module to empower young persons to make educated decisions regarding their daily health, sexuality, and perspective on risks involving HIV and AIDS. The computer software is entitled "LifeChoice," and uses the venue of a "virtual mall," where students can visit various sites (bookstore, music store, movie theater, pharmacy) to interact and access events and information. Development for Summer 1996 by A. Moore included research, networking, storyboard design, and acquisition of materials regarding birth control. The UMAB Health Sciences library, the internet, various interviews, and private and public organizations served as resources for this effort. The chapter on birth control was written for a fifth grade reading level and matched with appropriate graphics and interactivity. A database containing phone numbers, addresses, and websites about HIV/AIDS was also compiled. All chapters will be reviewed by the development team before inclusion in final program. This project was supported in part by a grant from Maryland Industrial Partnerships.

EXCRETION OF GENTAMICIN IN TOADFISH AND GOLDFISH. Jennifer Jones, Marshall Kinnel, and Renate Reimschuessel, V.M.D., Ph.D. Aquatic Pathobiology Center, University of Maryland School of Medicine, Baltimore, MD 21201

Previous work in our laboratory has demonstrated that goldfish can produce new nephrons in response to nephrotoxicity induced by gentamicin. The oyster toadfish (*Opsanus tau*) kidney, however, does not undergo nephrogenesis. To explore possible reasons for the differences in the formation of new nephrons we evaluate the excretion rate of gentamicin in both species. Toadfish were collected from the Chesapeake Bay and goldfish were obtained from a local distributor. Both species were acclimated to the laboratory for a minimum of 2 weeks. Fish were injected with 3.5 mg/kg IM of gentamicin, which is the reported therapeutic dose in channel catfish, or an equal volume of sterile water. Blood samples were taken by venipuncture at various time periods following injection (days 1, 2, 3, and 4 in goldfish and days 1, 2, 7, 14 in toadfish). Gentamicin levels were measured in plasma via the TDxFLx assay (Abbott Laboratory). Gentamicin levels declined rapidly in goldfish and reached baseline levels in 4 days, with over 60% of the dose eliminated within 24 hours. Gentamicin is primarily removed by glomerular filtration in goldfish and mammals, although a small amount is excreted by basolateral transport. Gentamicin had a much longer half-life in toadfish, retaining over 50% of the dose for 14 days. The prolonged elevated blood levels of gentamicin in the toadfish may be due to the fact that they are aglomerular and therefore can only excrete gentamicin by transport through the proximal tubules. Since the toadfish proximal tubules undergo necrosis during the first 24 hrs following injection this pathway for excretion is impaired. The residual presence of gentamicin for 2 weeks in the toadfish may inhibit any kidney regenerative or developmental repair responses.

THE RENAISSANCE SUMMER PROGRAM. Robyne Finney, Grace Lawrence, and Pattie Dillon. The Living Classroom Foundation, Baltimore, MD 21202.

This summer I participated in a program that came into existence through a collaboration between the Living Classroom Foundation and the Office of Title I, Baltimore County Public Schools. These two organizations have created an academic summer camp that blends alternative and traditional classroom teaching approaches: The Renaissance. The Renaissance Summer Program is designed to service two groups of two hundred Baltimore County students, grades three through eight, from 23 area Title I schools. The program's goal is to enhance students' problem solving skills. Activities focused on applying concepts and skills to real world problems and on connecting knowledge across a variety of subject areas. Students engage in a wide range of hands-on activities in small groups. Examples include outings on both a buyboat and a skipjack, a trek on a 100 acre llama farm, trips to many educational Inner Harbor sites, and sessions at the Maritime Institute. I saw that the nature of the activities in the program seemed to have a positive effect on students' development and retention of skills. These are skills that are necessary to successfully perform tasks on the Maryland School Performance Assessment Program.

ARE FIELD TRIPS IMPORTANT TO THE REGIONAL MATH SCIENCE CENTER? Justin Harbert and Roni Ringle. Frostburg State University's Regional Math Science Center, Frostburg, MD 21532.

As a tutor and counselor at the Regional Math Science Center (RMSC) I set several goals for myself. First, I needed to meet my requirements for MCTP. Second, I needed to be professional as a role model for the students. Finally, I needed to have fun. A summer program with fifty high school students living on a college campus, going to classes, and going on field trips spells fun. Being professional is becoming natural. Meeting the MCTP research requirement was tough. I spent a large amount of my free time interviewing, surveying, and talking with the students and staff about how important field trips were to the RMSC. I asked about the relevance of field trips to classwork, what students had learned on the field trips, how enjoyable they were, and whether they would recommend each of the field trips for future groups. The answer was consistently, "yes." Based on what I learned through this research, I plan to take my future students on field trips often. If I learned anything from this experience, it was that not all learning has to be done in the classroom.

MCTP WISHES TO ACKNOWLEDGE . . .

The Prince Georges County School System, one of the Project's collaborating school systems, for hosting us today at the Howard B. Owens Science Center. A special mention goes to Jim Strandquist and Russ Waugh, who donated their time and energies to help make our day run smoothly.

Our hostesses, 1995 Summer Research Interns

Aubrey Hill

Marshell Kinnel

Kathleen Winslow

The Internship Program Leadership *Dr. Jordan Warnick, Co-Director*

Dr. Karen Langford, Co-Director

Ms. Stephanie Stockman, Graduate Assistant

The Internship Program Advisory Group

Ms. Judith Anderson, Walker Middle School, Prince Georges County and 1996 Mentor Teacher to Interns

Dr. Wayne Bell, Vice President for External Relations, Center for Environmental and Estuarine Studies

Dr. Sharon Clark, Dept. of Education, Salisbury State Univ., and Journaling Presenter & Support, 1995-96

Dr. Lynn Dierking, Associate Director, Science Learning, Inc.

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Mrs. Elaine Griffin, Gilpin Manor Elementary School, Cecil County

Mrs. Marshell Kinnel, Calvert County Schools

Mrs. Jean Longstreth, Wilde Lake Middle School, Howard County and 1995-96 Mentor Teacher to Interns

Dr. Mary Owens, Department of Biology, Coppin State College

Ms. Susan Schulz, Watkins Mill High School, Montgomery County and 1996 Mentor Teacher to Interns

Ms. Jodie Smolik, Discovery Creek Children's Museum of Washington

Dr. Jim Strandquist, Supervisor of Science, Prince Georges County

Dr. Lee Summerville, Curriculum Coordinator of Science, Howard County, and Portfolio Presenter, 1996

Mrs. Marlene Weimer, 1996 Mentor Teacher to Interns

THE MCTP Project Leadership

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Dr. John Layman, Co-Principal Investigator

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